

## REDUCED GRAY MATTER VOLUME IN ORBITOFRONTAL CORTEX, INSULA AND BASAL GANGLIA DIFFERENTIALLY PREDICTS EARLY ONSET OF COCAINE, TOBACCO AND CANNABIS USE

Y.O. Faluyi<sup>1,2</sup>, P.S. Jones<sup>2</sup>, G.B. Williams<sup>3</sup>, K.D. Ersche<sup>2</sup>, KD Ersche s Addiction Research Group

<sup>1</sup>Cambridgeshire and Peterborough NHS Foundation Trust, <sup>2</sup>Behavioural and Clinical Neuroscience Institute and Department of Psychiatry, University of Cambridge, CB2 3EB and CB2 0SZ, <sup>3</sup>Wolfson Brain Imaging Centre, Department of Clinical Neurosciences, University of Cambridge, CB2 0QQ, Cambridge, UK

**Introduction:** Drug abuse is typically initiated during adolescence, which is a critical period of brain maturation and vulnerability to drug dependence. Accumulating evidence suggests that the early initiation of drug use is associated with altered brain structure compared to individuals who start taking drugs at a later stage in life, suggesting that these brain abnormalities might reflect neurobiological markers of vulnerability.

**Objectives:** Our objective was to identify neurobiological risk markers in the brain structure of cocaine-dependent individuals.

**Aims:** We aimed to investigate the effects of onset of drug use on the brain abnormalities typically seen in adults with cocaine dependence.

**Methods:** Sixty cocaine-dependent individuals and 60 healthy volunteers underwent an MRI brain scan. We used whole-brain voxel-based morphometry to find grey matter abnormalities in the cocaine group. We then performed three whole brain analyses of grey matter volume in the cocaine group using the general linear model with a within-group correlation design, separately for the drugs cocaine, tobacco and cannabis. We identified variance in grey matter uniquely attributable to the age at which each of these drugs was first used; the regressors were orthogonalised to the duration that each drug had been consumed.

**Results:** The age of first use was associated with a reduction in grey matter volume in distinctly different brain regions for cocaine, tobacco, and cannabis; irrespective of duration of use.

**Conclusions:** We identified neurobiological markers for three common drugs of abuse that may be associated with the risk for developing dependence.